Suisun Marsh Monitoring Program
Channel Water Salinity Report

Reporting Period: December 2005

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TABLE OF CONTENT

4. List of Figures

1. SUISUN MARSH MONITORING STATIONS AND REPORTING REQUIREMENT

As per SWRCB Water Rights Decision 1641, dated December 29, 1999, and previous SWRCB decisions, the California Department of Water Resources (DWR) is required to provide monthly channel water salinity compliance reports for the Suisun Marsh to the SWRCB. Conditions of channel water salinity in the Suisun Marsh are determined by monitoring specific electrical conductivity, which is referred as "specific conductance" (SC). The locations of all listed stations are shown in Figure 5.

The monthly reports are submitted for October through May each year in accordance with SWRCB requirements. The reports are required to include salinity data from the stations listed below to ensure salinity standards are met to protect habitat for waterfowl in managed wetlands:

Station Identification	Station Name	General Location	Classification
C-2*	Collinsville	Western Delta	Compliance Station
S-64	National Steel	Eastern Suisun Marsh	Compliance Station
S-49	Beldon's Landing	North-Central Suisun Marsh	Compliance Station
S-42	Volanti	North-Western Suisun Marsh	Compliance Station
S-21	Sunrise	North-Western Suisun Marsh	Compliance Station

Data from the stations listed below are included in the monthly reports to provide information on salinity conditions in the western Suisun Marsh.

Station Identification	Station Name	General Location	Classification
S-97	Ibis	Western Suisun Marsh	Monitoring Station
S-35	Morrow Island	South-Western Suisun Marsh	Monitoring Station

Information on Delta outflow, area rainfall, and operation of the Suisun Marsh Salinity Control Gates are also included in the monthly reports to provide information on conditions that may affect channel water salinity in the Marsh.

* Throughout the report, the representative data from nearby USBR station is used in lieu of data from station C-2.

2. Monitoring Results

2.1 Channel Water Salinity Compliance

During the month of December, 2005, salinity conditions at all five compliance stations are in compliance with channel water salinity standards of SWRCB (Table 1). Compliance with standards for the month of December was determined for each compliance station by comparing the progressive daily mean of high-tide SC with respective standards. The standard for compliance stations C-2, S-64, S-49, S-42 and S-21 are 15.5 mS/cm during December 2005. Table 1 lists monthly mean high-tide SC at these compliance stations. The progressive daily mean (PDM) is the monthly average of both daily high-tide SC values. The mathematical equation is shown below.

$$\text{PDM} = \frac{\sum \text{daily average of high tide SC}}{\text{\# days of the month}}$$

2.2 Delta Outflow

Outflow for December 2005 started off low around 8,000 cfs and increased above 24,000 cfs by December 5. The increase was a result of a precipitation event that occurred on December 2. Thereafter, outflow began to decrease and remained about 5,000 cfs until December 18. From December 18 through the end of the month, many more precipitation events led outflow to increase and ended the month with an impressive high of about 172,000 cfs. December 2005 outflow average for the month was about 4.5 times higher than last year December average. The monthly Delta outflow is represented by the mean Net Delta Outflow Index (NDOI). The NDOI is the estimated daily average of Delta outflow. Mean NDOI for December 2005 is listed below:

Month	Mean NDOI (cubic feet per second)
December	38,719

2.3 Rainfall

Compared to previous month of 2.16 inches and last year December total of 6.66 inches, December 2005 totaled 16.69 inches, which is more than last month and previous year December combined. The year ended on a high note with the largest precipitation of 5.20 inches for the month of December 2005.

Month	Total Rainfall (inches)
December	16.69

2.4 Suisun Marsh Salinity Control Gate (SMSCG) Operations

Operations and flashboard/boat lock installations at the SMSCG during December 2005 is summarized below.

Date	Gate status	Flashboards status	Boat Lock status
December 1 - 31	Open	Installed	Open

Due to favorable salinity levels in the marsh, gate operation was ceased on December 1 with all three gates held open and flashboards remain installed. Continuous monitoring of water quality continues, but salinity levels continue to be non-threatening for the remainder of the month and the status quo of the gates remained effective for December.

3. Discussion

3.1 Factors Affecting Channel Water Salinity in the Suisun Marsh

Factors that affect channel water salinity levels in the Suisun Marsh include:

- delta outflow;
- tidal exchange;
- rainfall and local creek inflow;
- managed wetland operations; and,
- operation of the SMSCG and flashboard configurations.

3.2 Observations and Trends

3.2.1 Conditions during the Reporting Period

During December 2005, salinity levels at Collinsville(C-2), National Steel(S-64), Beldons (S-49), Sunrise Club(S-21), and Volanti(S-42) ranged between 4.0 mS/cm and 13.0 mS/cm as shown in Figure 1. During the first half of December, salinity levels stabilized at most eastern stations, except Collinsville and National Steel. With SMSCG ceasing operations on December 1, 2005, salinity at National Steel increased by 2.0 mS/cm and remained at about 10.0 mS/cm the first half of December, whereas Collinsville decreased sharply and leveled off at 6.0 mS/cm for most of December before ending the month at about 4.0 mS/cm with the help of several precipitation events. At the two monitoring stations, S-97 and S-35, salinity levels ranged between 9.0 mS/cm and 17.0 mS/cm as shown in Figure 2. In the early half of December, the salinity decrease at both monitoring stations was a result of two precipitation events in early December. The second half of December (i.e. December 18, 2005) had several precipitation events and resulted in salinity level to decreases at both eastern and western stations as shown in Figures 1 and 2, respectively.

Overall, salinity levels at the end of December 2005 were below standards at all compliance and monitoring stations.

3.2.2 Comparison of Reporting Period Conditions with Previous Years

Monthly mean high-tide SC at the compliance and monitoring stations for December 2005 were compared with means for those months during the previous nine years (Figure 4).

Means salinity pattern of all compliance and monitoring stations resembles that of 2002, but higher in magnitude, except at Collinsville and S35, where mean monthly salinity is lower and the same, respectively . Compared to previous nine years, December 2005 salinity levels were ranked third in high Specific Conductance.

Table 1

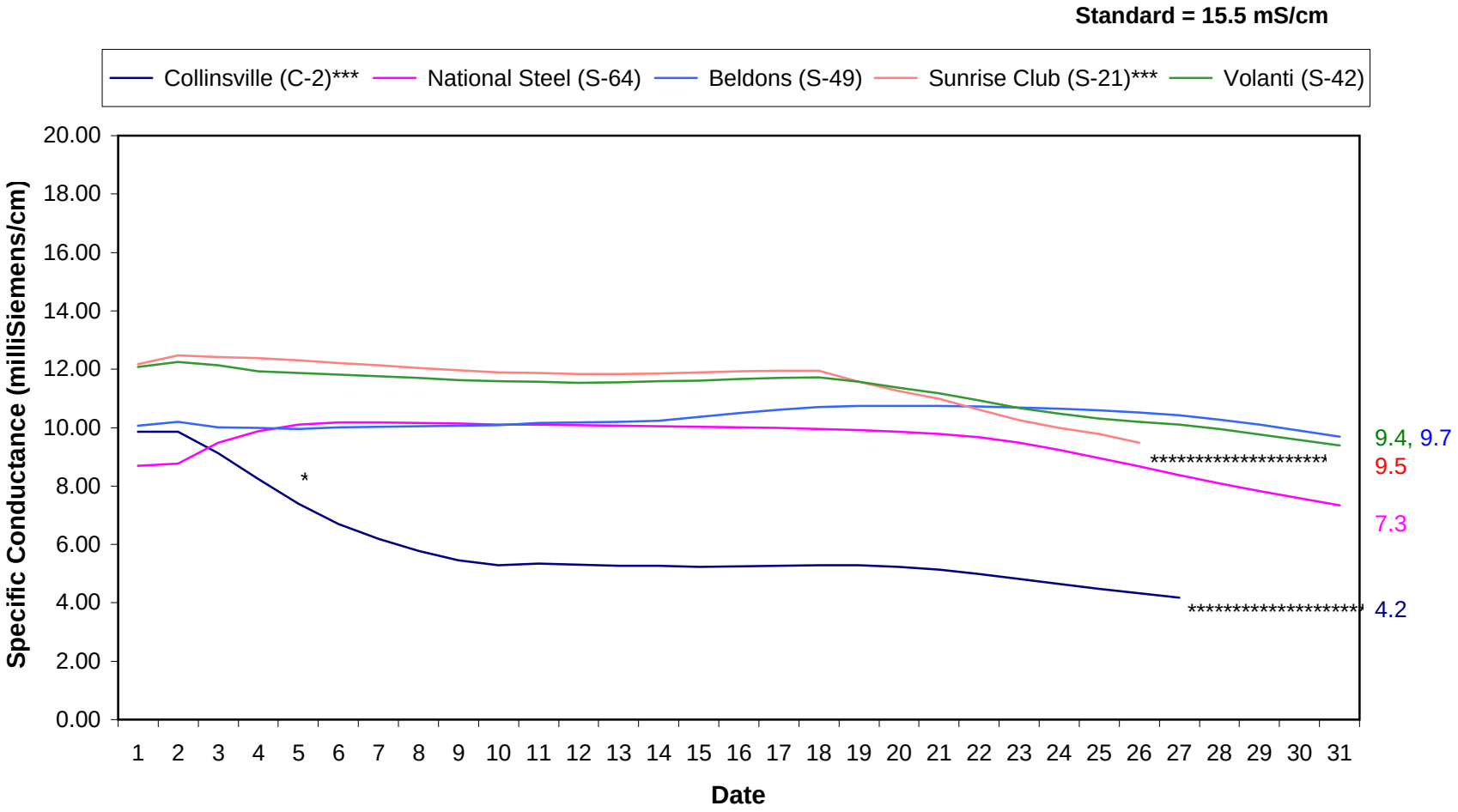
Monthly Mean High Tide Specific Conductance at Suisun Marsh Water Quality Compliance Stations

December 2005

Station	Specific Conductance (mS/cm)*	Standard	Standard meet?
C-2**	4.2***	15.5	Yes
S-64	7.3	15.5	Yes
S-49	9.7	15.5	Yes
S-42	9.4	16.5	Yes
S-21	9.5***	16.5	Yes

*milliSiemens per centimeter
**The representative data from nearby USBR station is used in lieu of data from station C-2.
***End of month PDM value not representative of entire month due to missing data resulting from equipment problem, however, the number of missing data is not enough to alter the overall result.

Figure 1. Suisun Marsh Progressive Mean High Tide Specific Conductance
December 2005



*** C2B and S-21 data missing due to equipment problem.

Figure 2. Suisun Marsh Progressive Mean High Tide Specific Conductance
December 2005

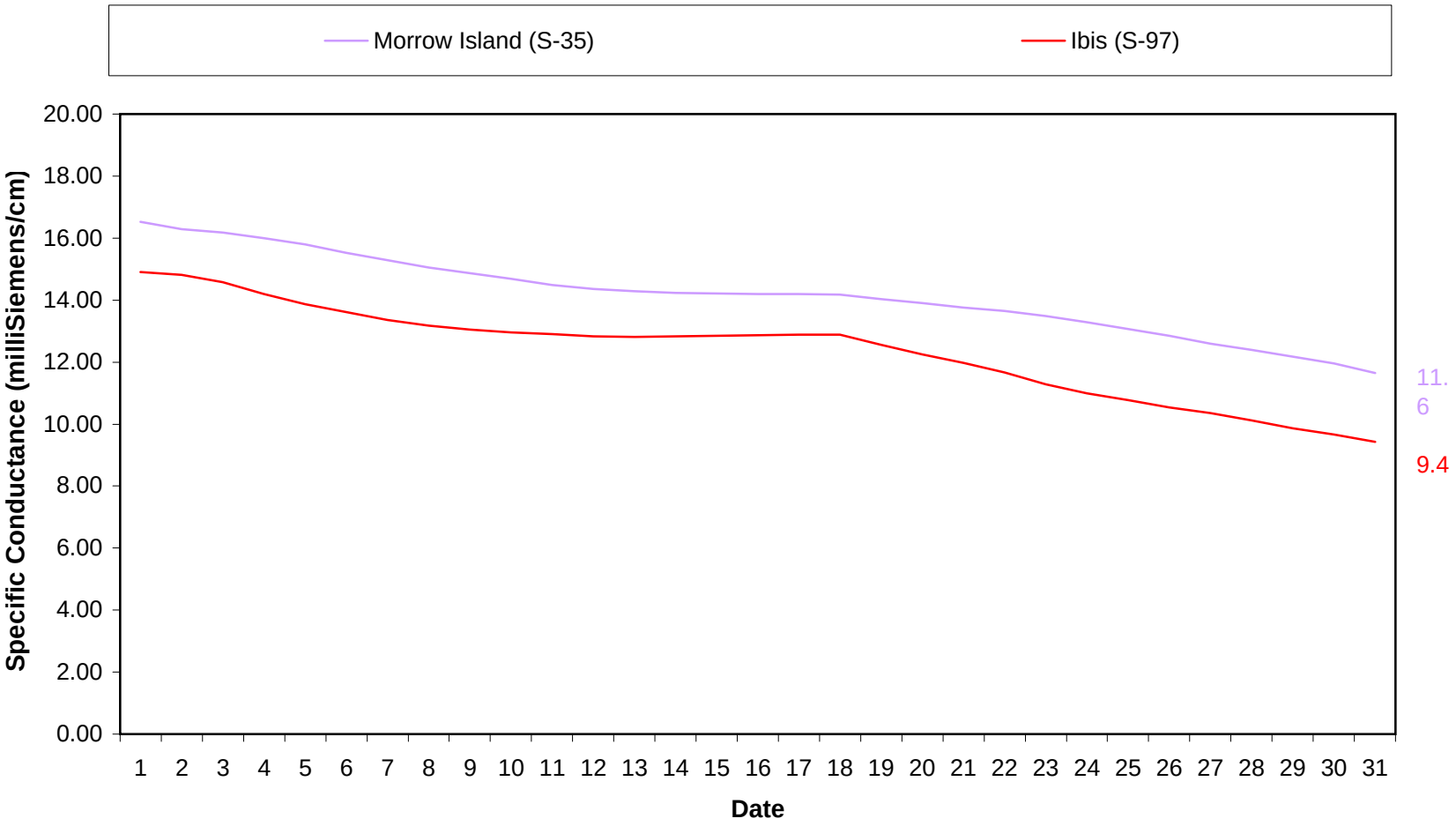
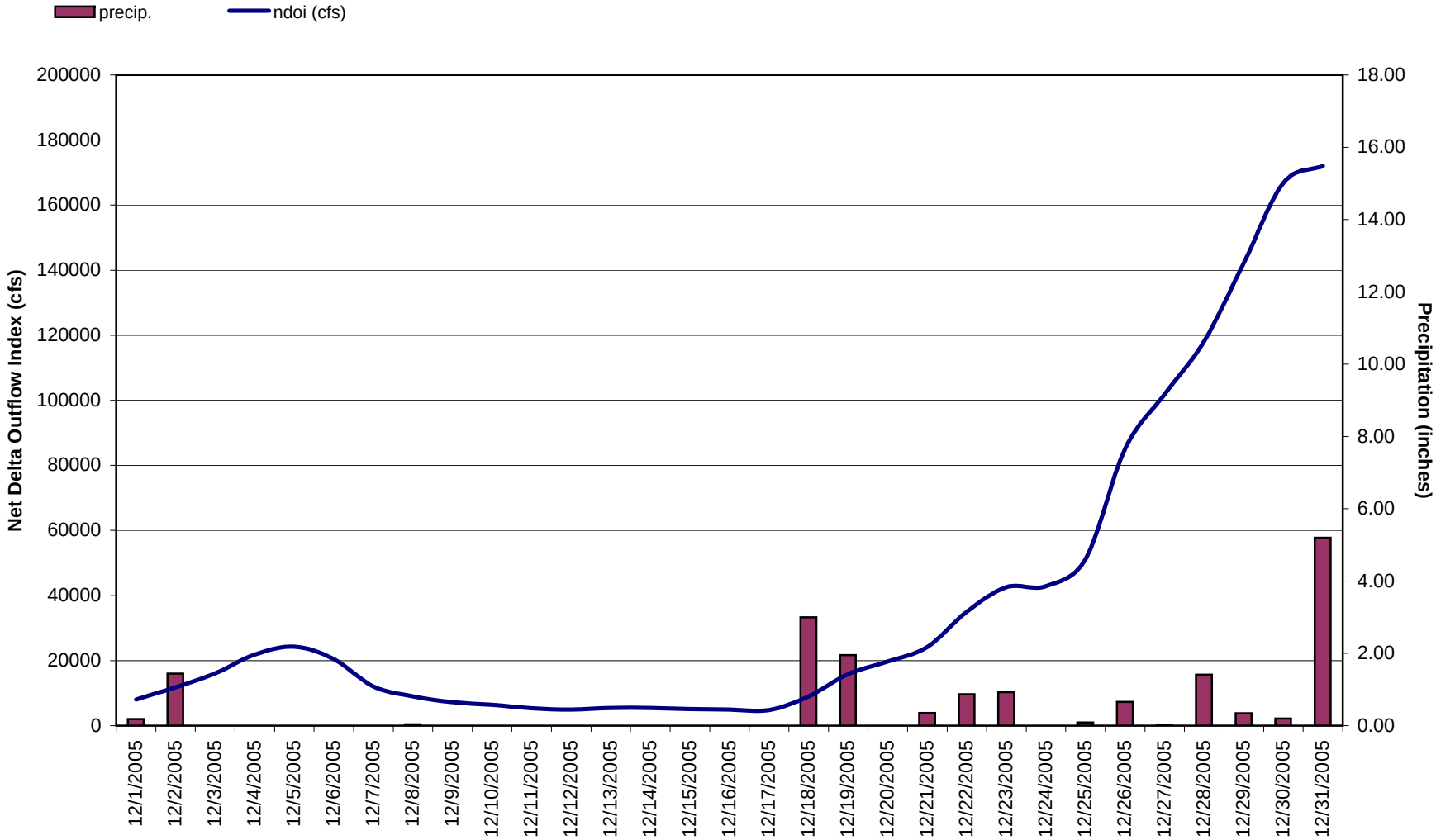
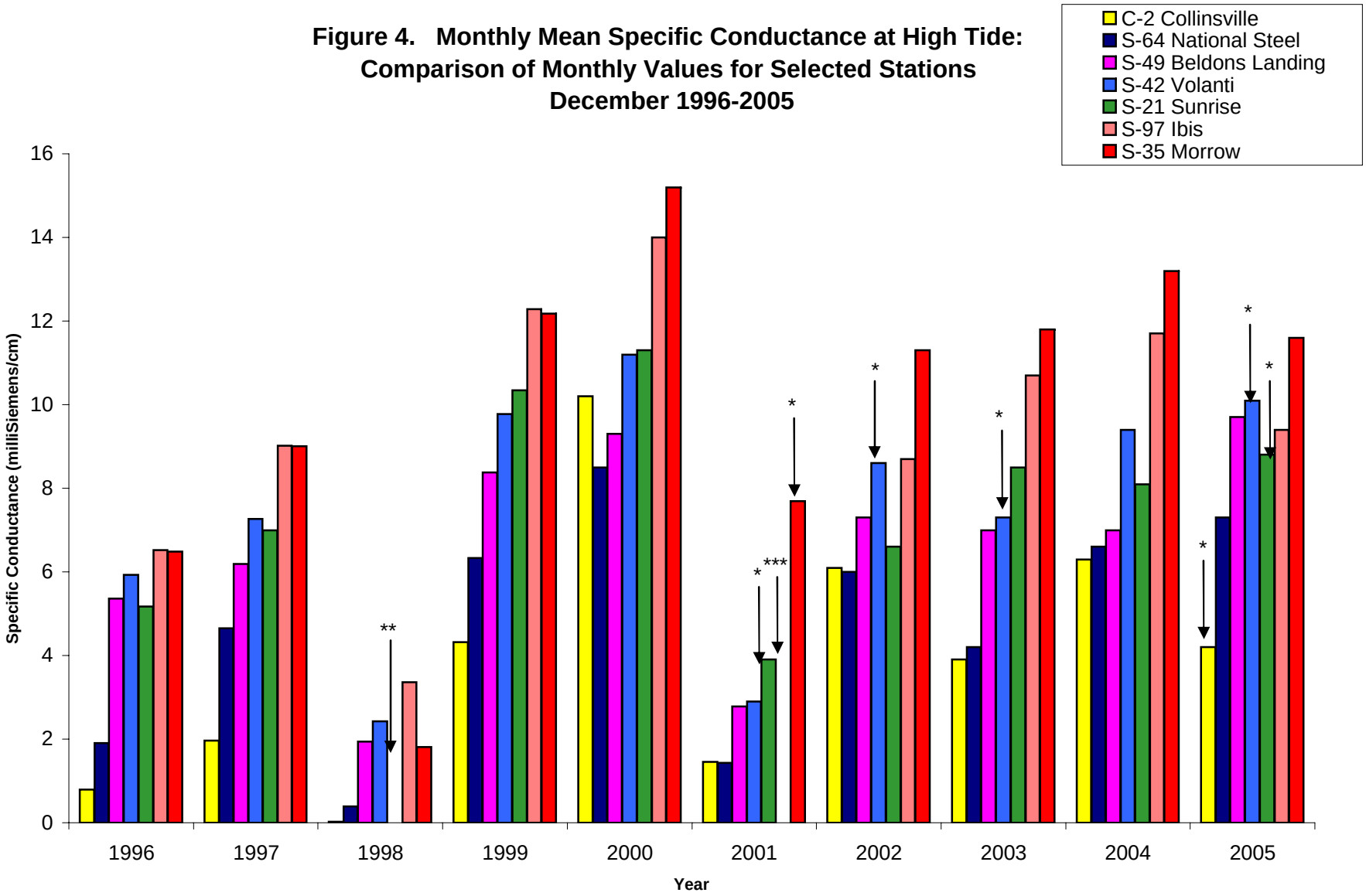


Figure 3. Daily Net Delta Outflow Index and Precipitation*
December 2005



*Preliminary DWR, O&M Delta Outflow data and precipitation from Fairfield Water Treatment Plant.

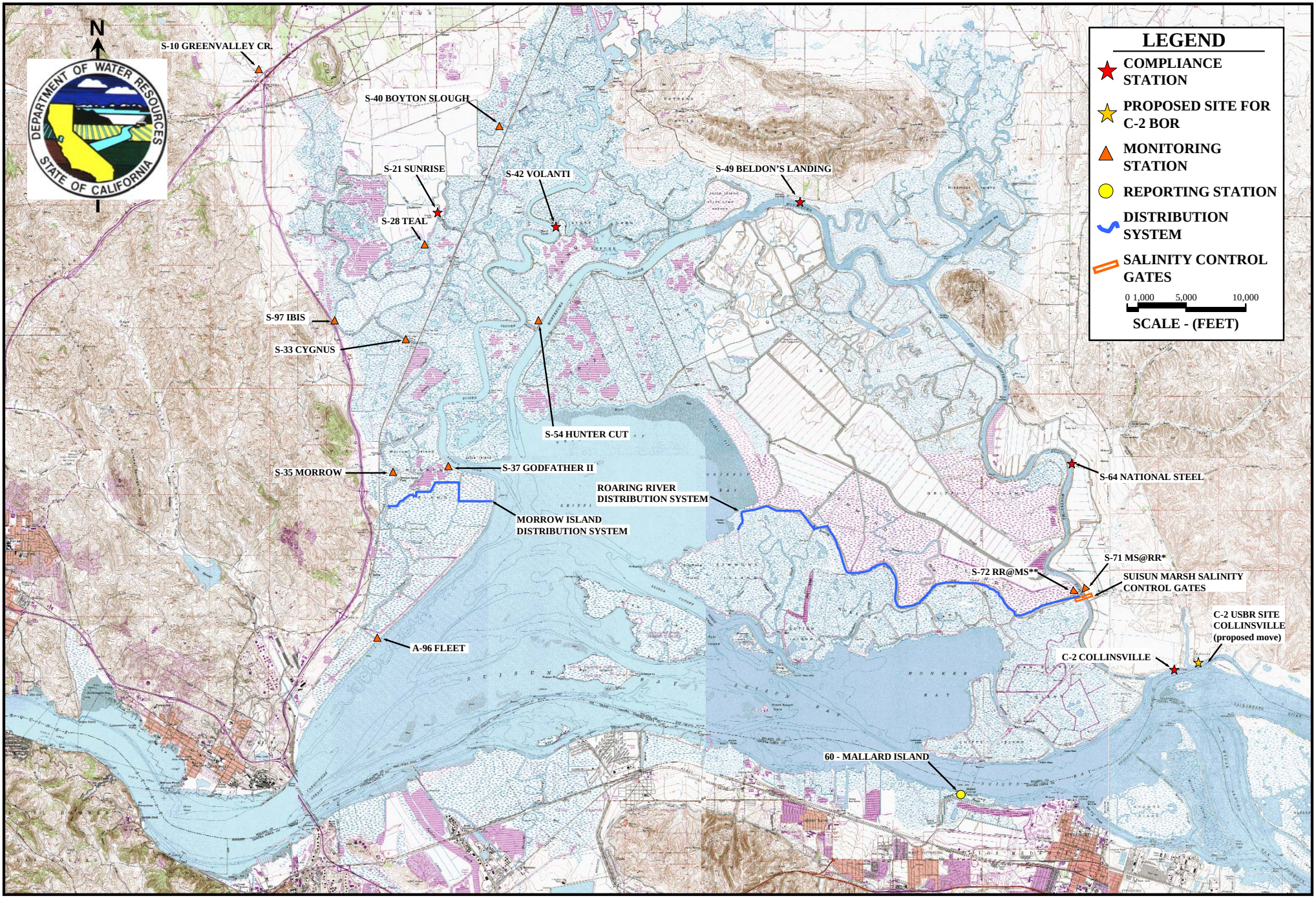
Figure 4. Monthly Mean Specific Conductance at High Tide: Comparison of Monthly Values for Selected Stations December 1996-2005



* Data does not reflect partial month. Data collection was interrupted before the end of the month due to equipment failure.

** Data was not obtained due to power problems at the station.

*** Data was not obtained due to equipment failure.



SUISUN MARSH PROGRAM WATER QUALITY MONITORING AND CONTROL FACILITIES